1,059,175

PATENT SPECIFICATION

NO DRAWINGS

1,059,175

Date of Application and filing Complete Specification: April 10, 1964.
No. 11917/66.
Application made in United States of America (No. 272,216) on April 11, 1963.
Two Applications made in United States of America (Nos. 336,615 and 336,625) on Jan. 9, 1964.
(Divided out of No. 1,059,174.)
Complete Specification Published: Feb. 15, 1967.

Index at acceptance:—C2 C(1E6K4, 1E7D1, 1E7F1, 1E7N5, 1E7P3, 1F2C6, 1F2D3, 1Q4, 1Q6C, 1Q7A, 1Q8A, 1Q9B, 1Q11D, 1Q11G, 2B31, 3A12A4A, 3A12A4B, 3A12A4C, 3A12B1, 3A12B2, 3A12C1, 3A12C5, 3A12C6, 3A14A3A, 3A14A5, 3A14A8A)

Int. Cl.:—C 07 d 57/02, C 07 d 99/02

COMPLETE SPECIFICATION

Heterocyclic Compounds which have Pharmacodynamic Activity and/or which are Intermediates in the preparation of products having Pharmacodynamic Activity

ERRATA

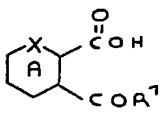
SPECIFICATION No. 1,059,175

Page 4, line 17, *before* "together" *delete* "by reacting" (second occurrence)
Page 5, line 51, *for* "-isoindol 1 5 - one." *read* "isoindol-5-one"
Page 6, line 5, *for* "149—151°S," *read* "149—151°C,"
Page 7, line 36, *for* "hexahydropyrimido" *read* "hexahydro pyrimido"
Page 8, line 8, *for* "1H-pyrido" *read* "11H-pyrido"

THE PATENT OFFICE
1st May 1967

The term "having pharmacodynamic activity", as used herein means that the compounds have at least one of the pharmaceutical properties specified in the preceding paragraph.

The invention provides compounds which have pharmacodynamic activity (as defined above) and/or which are intermediates in the preparation of products having such activity, said compounds being obtainable by reacting a compound of the general formula



I

or a functional derivative thereof (in which X is N or C, R^1 is a substituted or unsubstituted alkyl, aralkyl or aryl radical and ring A, which can be substituted, is aromatic

[*Price 4s. 6d.*]

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COMPLETE SPECIFICATION

Heterocyclic Compounds which have Pharmacodynamic Activity and/or which are Intermediates in the preparation of products having Pharmacodynamic Activity

PATENTS ACT, 1949

SPECIFICATION NO. 1,059,175

The following amendments were allowed under Section 29 on 18th October 1967.

Page 2, *delete* lines "34, 35 and 36" respectively

Page 15, *delete* lines "13 to 21" inclusive

Page 15, *for* claims "83 to 88" *read* "79 to 84" inclusive

Page 15, line 23, *delete* "75" *for* "82" *read* "75"

Page 15, line 26, *for* "75" *read* "76"

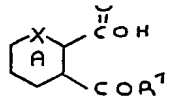
Page 15, line 33, *for* "83 to 86" *read* "79 to 82"

Page 15, line 35, *after* "56," *insert* "and"

Page 15, line 36, *delete* "and 82"

THE PATENT OFFICE,
11th December 1967

D 94122/10



I

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Int. Cl.:—C 07 d 57/02, C 07 d 99/02

COMPLETE SPECIFICATION

Heterocyclic Compounds which have Pharmacodynamic Activity and/or which are Intermediates in the preparation of products having Pharmacodynamic Activity

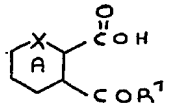
We, AMERICAN HOME PRODUCTS CORPORATION, a corporation organised and existing under the laws of the State of Delaware, United States of America, and having a place of business at 685 Third Avenue, New York 17, New York, U.S.A., do hereby declare the invention for which we pray that a patent may be granted to us and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to certain novel heterocyclic compounds which have pharmacodynamic activity and/or which are intermediates in the preparation of products which have pharmacodynamic activity, to processes of producing them, to pharmaceutical compositions containing them and to a process of making the pharmaceutical compositions.

The compounds in accordance with the invention display activity on the central nervous system and/or are intermediates in the preparation of products which display such activity. Thus, certain of them have central nervous system depressant activity, some have appetite depressant activity and some act as anticonvulsants. Yet again, certain of them have antidepressant activity, some of them have a tranquillising action some of them show anti-tremorine effects, some show mydriatic and some analgesic activities. Some of them are useful in exploring biological mechanisms in laboratory animals.

The term "having pharmacodynamic activity", as used herein means that the compounds have at least one of the pharmaceutical properties specified in the preceding paragraph.

The invention provides compounds which have pharmacodynamic activity (as defined above) and/or which are intermediates in the preparation of products having such activity, said compounds being obtainable by reacting a compound of the general formula

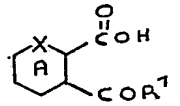


I

or a functional derivative thereof (in which X is N or C, R^1 is a substituted or unsubstituted alkyl, aralkyl or aryl radical and ring A, which can be substituted, is aromatic

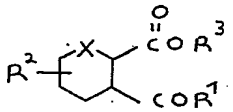
when X is N but is either saturated or unsaturated when X is C) with a diamine of the general formula R—NH—Z—NH_2 (in which R is hydrogen or alkyl and Z is an alkylene radical containing from 2 to 4 carbon atoms in a straight chain, which racical may be substituted, or is an unsubstituted or substituted *o*-arylene radical). Thus, Z may be an alkylene radical containing 2 to 4 carbon atoms in a straight chain, which may be substituted by methyl or hydroxy radicals. Examples of diamines of the general formula R—NH—Z—NH_2 are ethylene diamine (i.e 1,2-diamino ethane), N-ethyl ethylene diamine, 2,3-diaminobutane, 1,2-diaminopropane, 1,3-diaminopropane, 1,3-diamino-2-propanol, *o*-phenylene diamine and 4,5-dichloro-*o*-phenylene diamine.

The invention also provides a process of producing the compounds which have pharmacodynamic activity and/or which are intermediates in the preparation of products having such activity, which comprises reacting a diamine of the above general formula with a compound of the general formula



II

or a functional derivative thereof, where R^1, A and X have the meanings defined above. The compound to be reacted with the diamine advantageously is of the general formula



III

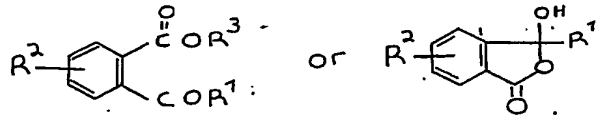
in which R^1 has the meanings defined above; R^3 is hydrogen or lower alkyl or the residue $—CO_2R^3$ can form a lactol ring with the residual R^1CO when R^3 is hydrogen; X is nitrogen, in which case the ring containing it is aromatic, or X is carbon in which case the ring containing it is saturated or unsaturated, and R^2 is hydrogen, halogen, sulphamyl, alkyl, e.g. lower alkyl, alkoxy, e.g. lower alkoxy, nitro, halo lower alkyl or alkyl sulphamyl. The term "lower" as used herein means the radical contains up to 5, and preferably up to 4 carbon atoms. When ring A is referred to as being unsaturated, it can be aromatically or ethylenically unsaturated.

The condensation reaction can be performed by refluxing the reactants for 2 to 16 hours. Where the diamine is a solid, an inert solvent such as toluene can be used to dissolve the reactants during the reaction. The end point of the reaction is reached when no more water distils over and at this point, for example, the product can be removed, e.g. by evaporation to a solid residue, and recrystallised from a lower alkanol, e.g. ethanol, or from ethyl acetate. Preferably water is removed continuously from the reaction mixture as it forms and preferably also the reaction is conducted at a temperature in the range 75—200°C.

When the compounds obtained contain a secondary amino group they can subsequently be acylated if desired, for example using an acetylating agent, e.g. acetic anhydride.

The compounds of the invention generally form salts with pharmaceutically acceptable acids (e.g. hydrochloric, sulphuric and fumaric acids), and the invention accordingly includes such salts.

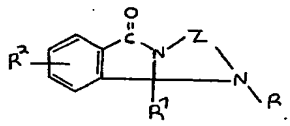
One group of compounds provided by the invention are those obtainable by reacting a compound of the general formula



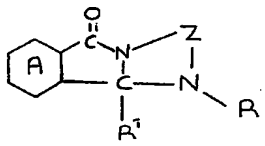
IV

(in which R^3 is a hydrogen atom or a lower alkyl radical, R^1 is a phenyl, halophenyl, lower alkoxyphenyl, halolower alkyl phenyl, lower alkyl phenyl, hydroxyphenyl, thienyl,

pyridyl or furyl radical and R^2 is hydrogen, halogen, lower alkyl, lower akoxy, nitro or halo lower alkyl) with a diamine of the general formula H_2NZNHR (in which Z is an *n*-propylene radical which may be substituted by hydroxy or lower alkyl radicals and R is hydrogen or lower alkyl) and the products obtained are believed to be of the general formula



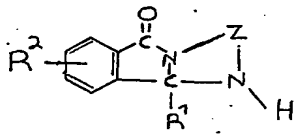
A preferred group of compounds provided by the invention are those whose formula has been found to be



V

in which Z is an alkylene radical containing 2 or 4 carbon atoms in a straight chain, which radical may be substituted by at least one alkyl group, R is hydrogen or a lower alkyl radical, R^1 is a substituted or unsubstituted phenyl ring or a 5- or 6- membered heterocyclic ring, and ring A is a substituted or unsubstituted benzene ring or a cyclohexane or cyclohexene ring.

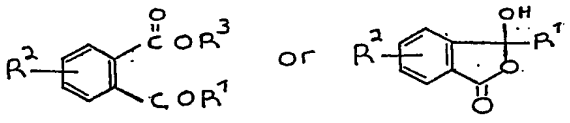
The preferred compounds of general formula V advantageously are those of the formula



VI

in which Z is alkylene radical containing 2 or 4 carbon atoms in a straight chain which radical Z may be substituted by at least one alkyl group (e.g. an ethylene 1,2-dimethylethylene or 1-methyl ethylene radical). R^1 is a phenyl, hydroxyphenyl, halophenyl (e.g. a *p*-halophenyl group preferably a *p*-chlorophenyl or *p*-bromophenyl group), lower alkoxy phenyl, halo lower alkyl phenyl (such as a trifluoromethyl or dichloromethyl phenyl group), lower alkyl phenyl or a thienyl (e.g. 2- or 3- thienyl), pyridyl or furyl group and R is hydrogen, halogen, lower alkyl, lower alkoxy, nitro or halolower alkyl.

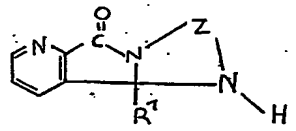
The compounds of general formula V and VI are prepared by the process outlined above, for example in the case of the compounds of general formula VI, a compound of the general formula



VII

can be reacted with the appropriate diamine of general formula $H_2N—Z—NH_2$.

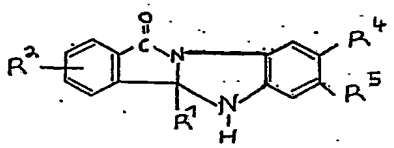
A less preferred group of compounds are those whose formula has been found to be



VIII

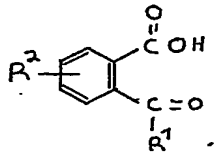
(in which R^1 is a phenyl, *p*-halophenyl, lower alkylphenyl, lower alkoxyphenyl, 2-thienyl or 3-thienyl radical and Z is an ethylene, 1,2-dimethylethylene, *n*-propylene or 2-hydroxypropylene radical, or an *o*-phenylene radical which may if desired be substituted by a lower alkyl radical, a halogen atom, a halolower alkyl radical, a sulphamyl radical or an alkyl sulphamyl radical). This group of compounds advantageously is prepared by reacting a picolinic acid substituted in the 2-position by a $-\overset{O}{\overset{\|}{C}}-R^1$ radical with a diamine of formula $H_2N-Z-NH_2$ in which R^1 and Z have the meanings defined in connection with formula VIII.

A further group of compounds provided by the general formula are those whose formula has been found to be

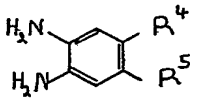


IX

in which R^1 is a lower alkyl, benzyl, phenylethyl, 2- or 3-thienyl, pyridyl, furyl, phenyl or phenyl substituted by a halogen atom or a lower alkyl, halolower alkyl, lower alkoxy or nitro group, R^2 is hydrogen, lower alkyl, halolower alkyl, lower alkoxy, halogen or nitro and R^4 and R^5 are halogen or hydrogen. This group of compounds advantageously is prepared by reacting by reacting together compounds of the general formulae



and



in which R^1, R^2, R^4 and R^5 have the meanings defined in connection with formula IX.

In our co-pending Application No. 14837/64, (1059174) from which the present invention is divided, we have described and claimed compounds obtained by the reduction of some of the products of the present invention.

The present invention also provides pharmaceutical compositions comprising a compound provided by the invention in association with a pharmaceutically acceptable carrier, and it moreover provides a process of bringing such a compound into a form suitable for therapeutic administration by associating it with a pharmaceutically acceptable carrier.

The pharmaceuticaly compositions may be made up for use in known manner by admixing the various liquid or solid carriers, either alone or in combination with other active agents. They can be administered in a wide variety of oral or parenteral dosage forms. Thus they can be associated with diluents, solvents, suspending agents, fillers, excipients, adhesives or colouring and flavouring materials to produce for instance tablets, capsules, suppositories or injectable solutions.

The following examples illustrate the invention. The identification of the structures in these Examples was made by testing procedures involving nuclear magnetic resonance and mass spectrometry.

EXAMPLE 1

o-Benzoylbenzoic acid (15 g.) and ethylene diamine (40 ml.) are refluxed for 3 hours. The mixture is quenched into ice water and the product separated by filtration. On recrystallisation from ethanol there is obtained a benzodiazacyclic carbonyl compound of m.p. 155—7°C identified as 9*b* - phenyl - 1,2,3,9*b* - tetrahydro - 5H - imidazo [2,1-*a*] isoindol - 5 - one. Analysis: Calculated for $C_{16}H_{14}N_2O$: C, 76.77; H, 5.63; N 11.20. Found C, 76.78; H, 5.56; N, 11.41.

When tested pharmacologically, this compound exhibited depressant anticonvulsant, and antitremorine effects.

EXAMPLE 2

o-Benzoylbenzoic acid (10 g.) and N-ethylethylene-diamine (15 ml.) are refluxed for 2 hours. The mixture is quenched into ice water and the product separated by filtration. A benzodiazacyclic product of m.p. 122—4°C is obtained on recrystallisation from aqueous ethanol. Analysis: Calculated for $C_{18}H_{18}N_2O$: C, 77.66; H, 6.51; N, 10.07. Found: C, 77.43; H, 6.31: N, 9.86. This compound was identified as 1 - ethyl-9*b* - phenyl - 1,2,3,9*b* - tetrahydro - 5H - imidazo - [2,1-*a*] isoindol - 5 - one.

When tested pharmacologically, this compound exhibited antidepressant and antitremorine activity.

EXAMPLE 3

o-(*p'*-Chlorobenzoyl) benzoic acid (10 g.) and ethylenediamine (15 ml.) are refluxed for two hours. The product is separated in the usual manner. On recrystallisation from ethanol there is obtained a benzodiazacyclic carbonyl compound of m.p. 164—5°C identified as 9*b* - (*p* - chlorophenyl) - 1,2,3,9*b* - tetrahydro - 5H - imidazo - [2,1-*a*] isoindol - 5 - one. Analysis: Calculated for $C_{16}H_{13}ClN_2O$: C, 67.48; H, 4.60; Cl, 12.45: Found C, 67.46; H, 4.47; N, 9.88; Cl, 12.3.

When tested pharmacologically, this compound exhibited anti-convulsant, tranquillising and antitremorine effects.

EXAMPLE 4

o-(*p'*-Chlorobenzoyl) benzoic acid (13 g.) and N-ethylethylenediamine (15 ml.) are refluxed for 2 hours. The product is separated in the usual manner. On recrystallisation from aqueous ethanol there is obtained a benzodiazacylic product of m.p. 114°C, which was identified as 1 - ethyl - 9*b* - (*p* - chlorophenyl) - 1,2,3,9*b* - tetrahydro - 5H - imidazo[2,1-*a*]isoindol - 5 - one. Analysis: Calculated for $C_{18}H_{17}ClN_2O$: C, 69.11; H, 5.47; Cl, 11.34; N, 9.86. Found: C, 69.17; H, 5.60; Cl, 11.2; N, 8.86.

When tested pharmacologically, this compound exhibited anti-convulsant activity, antidepressant activity, and anti-tremorine activity.

EXAMPLE 5

Methyl - *o* - (*p'* - methoxybenzoyl)benzoate (7 g.) and ethylenediamine (8 ml.) are refluxed for 15 hours. The product is separated in the usual manner. On recrystallisation from ethyl acetate there is obtained a benzodiazacyclic carbonyl compound of m.p. 159°C., identified as 9*b* - (*p* - methoxyphenyl) - 1,2,3,9*b* - tetrahydro - 5H - imidazo [2,1-*a*] - isoindol 1 5 - one. Analysis: Calc'd for $C_{17}H_{16}N_2O_2$: C, 72.84; H, 5.75; N, 10.00. Found: C, 72.79: M, 5.72: N, 10.04.

When tested pharmacologically, this compound exhibited anti-convulsant, antidepressant and anti-tremorine effects.

EXAMPLE 6

o-Benzoylbenzoic acid (22 g.) 2,3 - diamino - butane (10 g.) and toluene (400 ml.) are refluxed for 15 hours in a reaction flask equipped with a water separator. The solution is evaporated to a solid residue. On recrystallisation from ethanol there is obtained benzodiazacyclic product of m.p. 162—4°C, which was identified as 2,3 - dimethyl-9*b* - phenyl - 1,2,3,9*b* - tetrahydro - 5H - imidazo[2,1-*a*]isoindol - 5 - one. Analysis: Calc'd for $C_{18}H_{18}N_2O$: C, 77.66; H, 6.52; N, 10.07. Found C, 77.71; H, 6.58; N, 10.34.

EXAMPLE 7

o-Benzoylbenzoic acid (25 g.) and 1,2-diaminopropane (15 ml.) are refluxed 16 hours. The mixture is quenched into ice water and the product separated by filtration. On recrystallisation from ethanol there is obtained a benzodiazacyclic carbonyl compound of m.p. 149—151°S, identified as 3 - methyl - 9*b* - phenyl - 1,2,3,9*b* - tetrahydro - 5H - imidazo [2,1-*a*] isoindol - 5 - one. Analysis: Calc'd for $C_{17}H_{16}N_2O$: C, 77.25; H, 6.10; N, 10.60. Found C, 77.48; H, 5.99; N, 10.74.

EXAMPLE 8

2-Benzoylcyclohexanecarboxylic acid (15 g.) and ethylenediamine (30 ml.) are refluxed for 17 hours. The product is separated in the usual manner. On recrystallisation from aqueous alcohol there is obtained a benzodiazacyclic product of m.p. 170°C, which was identified as 9*b* - phenyl - 1,2,3,5*a*,6,7,8,9,9*a*,9*b* - decahydro - 5H - imidazo [2,1-*a*]isoindol - 5 - one. Analysis: Calc'd for $C_{16}H_{20}N_2O$: C, 74.96: H, 7.87; N, 10.93. Found: C, 74.71; H, 7.78; N, 10.80.

EXAMPLE 9

o-Benzoylbenzoic acid (10 g.) and 1,3-diaminopropane (15 ml.) are refluxed for 14 hours. The product is separated in the usual manner. On recrystallisation from ethanol there is obtained a product of m.p. 180—2°C. which was identified as 10*b*-phenyl - 1,2,3,4,6,10*b* - hexahydropyrimido[2,1-*a*]isoindol - 6(2H) - one. Analysis: Calc'd for $C_{17}H_{16}N_2O$: C, 77.25; H, 6.10; N, 10.60. Found: C, 77.21; H, 5.97; N, 10.51.

When tested pharmacologically, this compound exhibited depressant and anticonvulsant activities.

EXAMPLE 10

o-(*p'*-Chlorobenzoyl)benzoic acid (20 g.) and 1,3-diaminopropane (25 ml.) are refluxed for 15 hours. The product is separated in the usual manner. On recrystallisation from aqueous alcohol there is obtained a product of m.p. 130°C. which was identified as 10*b* - (*p* - chlorophenyl) - 1,2,3,4,6,10*b* - hexahydro pyrimido[2,1-a]isoindol-6(2H)one. Analysis: Calc'd for $C_{17}H_{15}ClN_2O$: C, 68.33; H, 5.06; Cl, 11.87; N, 9.38. Found: C, 68.40; H, 5.04; Cl, 12.0; N, 9.53.

EXAMPLE 11

o-Benzoylbenzoic acid (11 g.) and 1,3-diamino-2-propanol (5 g.) and toluene (100 ml.) are refluxed for 16 hours in a reaction flask equipped with a water separator. The solution is evaporated in vacuo to a gummy residue. On recrystallisation from ethyl acetate there is obtained a product of m.p. 225—7°C. which was believed to be 3-hydroxy - 10*b* - phenyl - 1,2,3,4,6,10*b* - hexahydropyrimido[2,1-*a*]isoindol - 6(2H)-one. Analysis: Calc'd for $C_{17}H_{16}N_2O$: C, 72.83; H, 5.75; N, 10.00. Found: C, 72.83; H, 5.75; N, 10.07.

When tested pharmacologically, this compound exhibited anti-convulsant and antitremorine activities.

EXAMPLE 12

o-(*p'*-Hydroxybenzoyl)benzoic acid (13 g.) 1,3-diamino-2-propanol (6 g.) and toluene (100 ml.) were refluxed for 15 hours in a reaction flask equipped with a water separator. The product is separated by filtration. On recrystallisation from ethyl acetate there is obtained a product of m.p. 263°C which was believed to be 3 - hydroxy - 10*b*-(*p* - hydroxy phenyl) - 1,2,3,4,6,10*b* - hexahydro pyrimido[2,1-*a*]isoindol - 6(2H)one. Analysis: Calc'd for $C_{17}H_{16}N_2O_3$: C, 68.90; H, 5.44; N, 9.45. Found: C, 69.01; H, 5.29; N, 9.70.

EXAMPLE 13

o-(*p'*-Chlorobenzoyl)benzoic acid (13 g.) and 1,3-diamino-2-propanol (10 ml.) are refluxed for 2 hours. The mixture is quenched into ice water and the product separated by filtration. On recrystallisation from ethyl acetate there is obtained a product of m.p. 228°C. which was believed to be 10*b* - (*p* - chlorophenyl) - 3 - hydroxy - 1,2,3,4,6,10*b*-hexahydropyrimido[2,1-*a*]isoindol-6(2H)one. Analysis: Calc'd for $C_{17}H_{15}ClN_2O_2$: C, 64.87; N, 4.80; Cl, 11.27; N, 8.90. Found: C, 64.71; H, 4.55; Cl, 11.0; N, 9.14.

When tested pharmacologically, this compound exhibited anticonvulsant, antidepressant and antitremorine activity.

EXAMPLE 14

Methyl - *o* - (*p'* - methoxybenzoyl)benzoate (4 g.) and 1,3 - diamino - 2 - propanol (5 ml.) are refluxed for 3 hours. The mixture is quenched into ice water and the product separated by filtration. On recrystallisation from ethyl acetate there is obtained a

reaction product of m.p. 220°C. which was believed to be 3 - hydroxy - 10*b* - (*p*-methoxy phenyl) - 1,2,3,4,6,10*b* - hexahydropyrimido[2,1-*a*]isoindol - 6 - (2H)one. Analysis: Calc'd for $C_{18}H_{18}N_2O_3$: C, 69.66; H, 5.84; N, 9.03. Found: C, 69.73; H, 5.77; N, 9.07.

When tested pharmacologically, this compound exhibited anti-convulsant and depressant activities.

EXAMPLE 15

2-Benzoylcyclohexanecarboxylic acid (10 g.) and 1,3-diamino-2-propanol (10 ml.) are refluxed for 16 hours. The mixture is cooled, triturated with ethyl acetate, and the product separated by filtration. On recrystallisation from ethanol there is obtained a product of m.p. 295°C. believed to be 3 - hydroxy - 10*b* - phenyl - 1,2,3,4,6,6*a*,7,8,9,10,10*a*,10*b*-dodecahydropyrimido[2,1-*a*]isoindol-6(2H)-one. Analysis: Calc'd for $C_{17}H_{22}N_2O_2$; C, 71.30; H, 7.74; N, 9.79. Found: C, 71.46; H, 7.64; N, 9.60.

EXAMPLE 16

3-Benzyl-3-hydroxyphthalide (15 g.) and ethylenediamine (30 ml.) are refluxed for 16 hours. The mixture is quenched into ice water and the product separated by filtration. On recrystallisation from aqueous ethanol there is obtained a benzodiazacyclic product of m.p. 115—117°C. which was identified as 9*b* - benzyl - 1,2,3,9*b* - tetrahydro - 5H - imidazo[2,1-*a*]isoindol - 5 - one. Analysis: Calc'd for $C_{17}H_{16}N_2O$: C, 77.25; H, 6.10; N, 10.60. Found: 76.95; H, 6.10; N, 10.39.

This compound was also made by reacting *o*-(phenylacetyl) benzoic acid and ethylene diamine.

EXAMPLE 17

2-Benzoyl-4-nitrobenzoic acid and ethylene diamine are refluxed for several hours to give, after isolation as usual, a benzodiazacyclic product of m.p. 203°C., identified as 8 - nitro - 9*b* - phenyl - 1,2,3,9*b* - tetrahydro - 5H - imidazo[2,1-*a*] isoindol - 5-one.

The condensation reaction described in the foregoing Examples can also be applied to the following starting materials in a similar manner.

(a) *o*-(3-Thenoyl)benzoic acid and ethylenediamine to give 9*b*-(3-thienyl)-1,2,3,9*b*-tetrahydro-5*H*-imidazo[2,1-*a*]isoindol-5-one.

(b) *o*-(3-Furoyl)benzoic acid and ethylenediamine to give 9*b*-(3-furyl)-1,2,3,9*b*-tetrahydro-5*H*-imidazo [2,1-*a*]isoindol-5-one.

(c) Ethyl *o*-(*m'*-trifluoromethyl-phenyl)benzoate and ethylenediamine to give 9*b*-(*m*-trifluoromethylphenyl-1,2,3,9*b*-tetrahydro-5*H*-imidazo[2,1-*a*]isoindol-5-one.

(d) *o*-(*o'*-Tolyl)-benzoic acid and 1,3-diaminopropane to give 10*b*-(*o*-tolyl)-1,2,3,4,6,10*b*-hexahydropyrimido[2,1-*a*]isoindol-6(2H)one.

(e) 2-Benzoyl-5-methylbenzoic acid and ethylenediamine to give 7-methyl-9*b*-phenyl-1,2,3,9*b*-tetrahydro-5*H*-imidazo[2,1-*a*]isoindol-5-one.

(f) 2-Benzoyl-5-methoxybenzoic acid and ethylenediamine to give 7-methoxy-9*b*-phenyl-1,2,3,9*b*-tetrahydro-5H-imidazo[2,1-*a*]isoindol-5-one.

(g) 2-Benzoyl-5-trifluoromethylbenzoic acid and ethylenediamine to give 9*b*-phenyl-1,2,3-9*b*-tetrahydro-7-trifluoromethylphenyl-5*H*-imidazo[2,1-*a*]isoindol-5-one.

EXAMPLE 18

3-(*p*-Chlorobenzoyl)picolinic acid (13 g.), ethylenediamine (20 ml.) and toluene (75 ml.) are refluxed for five hours in a flask equipped with a water separator. The solution is cooled and the precipitated solid is removed by filtration. Recrystallisation from ethanol gives a product of m.p. 229°C, which was identified as 9*b*-(*p*-chlorophenyl)-1,2,3,9*b*-tetrahydro-5H-imidazo[1,2-*a*]pyrido[3,2-*c*]pyrrol-5-one.

When tested pharmacologically this compound showed mydriatic, anticonvulsant and analgesic effects.

EXAMPLE 19

3-(*p*-Chlorobenzoyl)picolinic acid (13 g.) 2,3-diaminobutane (20 ml.) and toluene (75 ml.) are refluxed for 6 hours in a flask equipped with a water separator. The solution is cooled and the precipitated solid is removed by filtration. Recrystallisation from ethanol give a product of m.p. 250—2°C, which was identified as 9*b*-(*p*-chlorophenyl)-2,3-dimethyl-1,2,3-9*b*-tetrahydro-5H-imidazo[1,2-*a*]pyrido[3,2-*c*]pyrrol-5-one.

EXAMPLE 20

3-(*p*-Chlorobenzoyl)picolinic acid (9 g.), 1,3-diaminopropane (15 ml.) and toluene (100 ml.) are refluxed for 6 hours in a flask equipped with a water separator. The solution is cooled and the precipitated solid is removed by filtration. Recrystallisation from

ethanol gives a product of m.p. 248°C, which was identified as 10*b*-(*p*-chlorophenyl)-1,2,3,4,6,10*b*-hexahydropyrimido[1,2-*a*]pyrido[3,2-*c*]pyrrol-6(2H)-one.

EXAMPLE 21

3-(*p*-Chlorobenzoyl)picolinic acid (10 g.), *o*-phenylenediamine (6 g.) and toluene (100 ml.) are refluxed for 6 hours in a flask equipped with a water separator. The solution is cooled and the precipitated solid is removed by filtration. Recrystallisation from ethanol gives a product of m.p. 257°C which was identified as 4*b* - (*p* - chlorophenyl)-4*b*,5 - dihydro - 1H - pyrido[3'2': 3,4]pyrrolo[1,2-*a*]benzimidazol - 11 - one.

EXAMPLE 22

3 - (*p* - Chlorobenzoyl)picolinic acid (10 g.), 1,3 - diamino - 2 - hydroxypropane (15 ml.) and toluene (100 ml.) are refluxed for 6 hours in a flask equipped with a water separator. The solution is evaporated to a solid residue and recrystallisation from ethanol give a product of m.p. 251—3°C which was identified as 10*b* - (*p* - chlorphenyl)-3 - hydroxy - 1,2,3,4,6,10*b* - hexahydropyrimido[1,2-*a*]pyrido[3,2-*c*]pyrrol - 6(2H)-one.

EXAMPLE 23

2-Benzoylbenzoic acid (12 g.), *o*-phenylenediamine (6 g.) and toluene (75 ml.) are refluxed for 16 hours in a flask equipped with a water separator. The solution is evaporated to a solid residue and recrystallisation from ethanol gives a product of m.p. 185—7°C. This was identified as 4*b* - phenyl - 4*b*,5 - dihydro - 11H - isoindolo[2,1-*a*]-benzimidazol - 11 - one.

EXAMPLE 24

2-Benzoylbenzoic acid (10 g.) 4,5-dichloro-*o*-phenylenediamine (8 g.) and toluene (100 ml.) are refluxed for 16 hours in a flask equipped with a water separator. The solution is evaporated to a solid residue and recrystallisation from ethanol gives a product of m.p. 203—5°C. This product was identified as 7,8 - dichloro - 4*b* - phenyl-4*b*,5 - dihydro - 11H - isoindolo[2,1-*a*]benzimidazol - 11 - one.

EXAMPLE 25

2-(*p*-Chlorobenzoyl)benzoic acid (13 g.), *o*-phenylenediamine (6 g.) and toluene (100 ml.) are refluxed for 14 hours in a flask equipped with a water separator. The solution is evaporated to a solid residue and recrystallisation from ethanol gives a product of m.p. 162—4°C. This product was identified as 4*b* - (*p* - chlorophenyl) - 4*b*,5-dihydro - 11H - isoindolo[2,1-*a*]benzimidazol - 11 - one.

EXAMPLE 26

2-(*a*-Thenoyl)benzoic acid (9 g.), *o*-phenylenediamine (7 g.) and toluene (100 mL) are refluxed for 16 hours in a flask equipped with a water separator. The solution is evaporated to a solid residue and recrystallisation from ethyl acetate gives a product of m.p. 195°C. This product was identified as 4*b* - (*α* - thienyl) - 4*b*,5 - dihydro - 11H-isoindolo[2,1-*a*]benzimidazol - 11 - one.

EXAMPLE 27

2-Acetylbenzoic acid (10 g.), *o*-phenylenediamine (4 g.) and toluene (100 ml.) are refluxed for 16 hours in a flask equipped with a water separator. The solution is evaporated to a solid residue and recrystallisation from ethanol gives a product of m.p. 172—4°C. This product was identified as 4*b*-methyl-4*b*,5-dihydro-11H-isoindolo[2,1-*a*]-benzimidazol - 11 - one.

EXAMPLE 28

3-Benzyl-3-hydroxyphthalide (12 g.), *o*-phenylenediamine (5 g.) and toluene (100 ml.) are refluxed for 18 hours in a flask equipped with a water separator. The solution is evaporated to a solid residue and recrystallisation from ethanol gives a product of m.p. 165°C. This product was identified as 4*b*-benzyl-4*b*,5-dihydro-11H-isoindolo-[2,1-*a*]benzimidazol-11-one.

EXAMPLE 29

The procedure of Example 1 was repeated, but using *o*-(*p'*-fluorobenzoyl)benzoic acid and ethylene diamine to form a benzodiazacyclic product identified as 9*b*-(*p*-fluorophenyl)-1,2,3-9b-tetrahydro-5*H*-imidazo[2,1-*a*]isoindol-5-one.

EXAMPLE 30

o-(2-thenoyl) benzoic acid was reacted with ethylene diamine as in Example 1 to

form a benzodiazacyclic product identified as 9*b*-(2-thienyl)-1,2,3-9*b*-tetrahydro-5H-imidazo[2,1-a]isoindol-5-one.

EXAMPLES 31—46

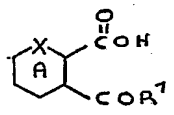
The procedure of Example 1 was repeated on the following starting compounds to give the final products indicated

Starting Compounds	*Product and melting point*
31. *o* - (*p'* - Chlorobenzoyl)benzoic acid and 1,2-diaminopropane. Product obtained by separation of isomers by fractional crystallisation in a ratio of 3 to 1.	m.p. 130°C. The product was a mixture of 2- and 3 - methyl - 10*b* - (*p* - chloro phenyl) - 1,2,3,4,6,10*b* - hexahydro-pyrimido [2,1-*a*]isoindol - 6(2H) one. In this Example and Example 36, the melting point given is that of the larger amount of product.
32. *o* - (2 - Thenoyl)benzoic acid and 2,3-diaminobutane.	m.p. 152°C. The benzodiazacyclic product was identified as 2,3 - dimethyl-9*b* - (2 - thienyl) - 1,2,3,9*b* - tetrahydro-5*H* - imidazo[2,1-a]isoindol - 5 - one.
33. 1,2,3,6 - Tetrahydro - 2 - benzoyl-benzoic acid and ethylene diamine.	m.p. 203—5°C. The product is believed to be 9b - phenyl - 1,2,3,5a,6,9,9a,9b-octahydro - 5H - imidazo[2,1-*a*] - iso-indol - 5 - one.
34. *o* - (*p'* - Hydroxybenzoyl) - benzoic acid and ethylene diamine.	m.p. 266—8°C. The benzodiazacyclic product was identified as 9*b*-(*p*-hydroxy-phenyl) - 1,2,3,9b - tetrahydro - 5H-imidazo[2,1-*a*]isoindol - 5 - one.
35. *o* - (3 - Amino - 4 - chlorobenzoyl)-benzoic acid and ethylene diamine.	m.p. 172—4°C. The benzodiazacyclic product was identified as 9*b* - (3 - amino-4 chlorophenyl) - 1,2,3,9*b* - tetrahydro-5H - imidazo[2,1-*a*]isoindol - 5 - one.
36. *o* - (*p'* - Chlorobenzoyl) - benzoic acid and 1,2 - diaminopropane. Separated from mixture of isomers (see Example 31).	m.p. 192°C. The product was a mixture of 10*b* - (*p* - chlorophenyl) - 2- and 3-methyl - 1,2,3,4,6,10*b* - hexahydro pyrimido [2,1-*a*]isoindol - 6(2H)one
37. *o* - (3 - Amino - 4 - chlorobenzoyl)-benzoic acid and N-methyl ethylene diamine.	m.p. 176—8°C. The benzodiazacyclic product was identified as 9*b* - (3-amino - 4 - chlorophenyl) - 1 - methyl-1,2,3,9*b* - tetrahydro - 5H - imidazo-[2,1-*a*]isoindol - 5 - one.
38. *o* - (*p'* - Chlorobenzoyl)benzoic acid and N-methylethylene diamine.	m.p. 134—6°C. The benzodiazacyclic product was identified as 9b - (*p*-chloro-phenyl) - 1 - methyl - 1,2,3,9*b* - tetra-hydro - 5H - imidazo[2,1-*a*]isoindol-5 - one.
39. *o* - (2 - Thenoyl) - benzoic acid and 1,3-diaminopropane,	m.p. 173°C. The product was identified as 10*b* - thienyl - 1,2,3,4,6,10*b* - hexa-hydropyrimido - [2,1-*a*]isoindol - 6(2H)-one

	Starting Compounds	*Product and melting point*
40.	2 - Benzoyl - 4 - nitro - benzoic acid and 1,3 - diaminopropane.	m.p. 218°C. The product was identified as 9 - nitro - 10*b* - phenyl - 1,2,3,4,6, 10*b* - hexahydro pyrimido[2,1-*a*]isoindol - 6(2H)one.
41.	*o* - Phenylacetylbenzoic acid and 1,3 - diamino - 2 - hydroxypropane.	m.p. 166—8°C. The product was believed to be 10*b* - benzyl - 3 - hydroxy-1,2,3,4,6,10*b* - hexahydro pyrimido [2,1-*a*]isoindol - 6(2H)one.
42.	*o*-Phenylacetylbenzoic acid	m.p. 131—3°C. The product was identified as 10*b* - benzyl - 1,2,3,4,6 - 10*b*-hexahydro pyrimido[2,1-*a*]isoindol - 6 (2H)one.
43.	*o* - (3 - Amino - 4 - chlorobenzoyl)-benzoic acid and 1,3 - diamino - 2-hydroxy - propane.	m.p. 219—221°C. The product was believed to be 10*b* - (3 - amino - 4-chlorophenyl) - 3 - hydroxy - 1,2,3,4,6,10*b*-hexahydropyrimido[2,1-*a*]isoindol - 6 (2H)one.
44.	*o* - (3 - Amino - 4 - chlorobenzoyl)-benzoic acid and 1,3-diamino-propane.	m.p. 111—113°C, measured as the ethanolate. The product was identified as 10*b* -(3 - amino - 4 - chlorophenyl)-1,2,3,4,6,10*b* - hexahydropyrimido-[2,1-*a*]isoindol - 6(2H)one.
45.	*o* - (*p'* - Fluorobenzoyl) - benzoic acid and *o*-phenylene diamine.	m.p. 170—2°C. The product was identified as 4*b* - (*p* - fluorophenyl) - 4*b*,5-dihydro - 11H - isoindolo[2,1-*a*]benzimidazol - 11 - one.

WHAT WE CLAIM IS:—

1. Compounds having pharmacodynamic activity (as herein before defined) and/or which are intermediates in the preparation of products which display such activity and obtainable by reacting a compound of the general formula:



or a functional derivative thereof (in which X is N or C, R^1 is a substituted or unsubstituted alkyl, aralkyl or aryl radical and ring A, which can be substituted, is aromatic when X is N but is either saturated or ethylenically or aromatically unsaturated when X is C) with a diamine of the general formula:

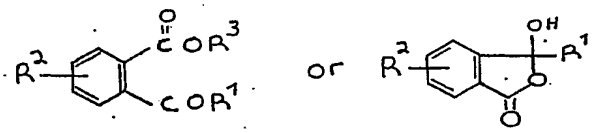
$$R—NH—Z—NH_2$$

(in which R is hydrogen, or alkyl, and Z is an alkylene radical containing from 2 to 4 carbon atoms in a straight chain which radical may be substituted, or is an unsubstituted or substituted *o*-arylene radical.

2. Compounds as claimed in Claim 1, wherein Z is an alkylene radical containing from 2 to 4 carbon atoms, which radical can be substituted by methyl or hydroxy radicals.

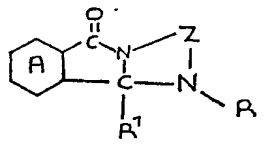
3. The salts, with pharmaceutically acceptable acids, of the compounds claimed in any of the preceding claims.

4. Compounds as claimed in Claim 1 obtainable by reacting a compound of the general formula



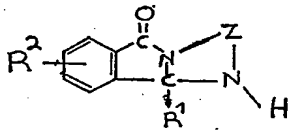
(in which R^3 is a hydrogen atom or a lower alkyl radical, R^1 is a phenyl, halophenyl, lower alkoxyphenyl, halolower alkyl phenyl, lower alkyl phenyl, hydroxyphenyl, thienyl, pyridyl or furyl radical and R^2 is hydrogen, halogen, lower alkyl, lower alkoxy, nitro, or halo lower alkyl, and " lower " means the radicals contain 1 to 5 carbon atoms) with a diamine of the general formula H_2NZNHR in which Z is an *n*-propylene radical which may be substituted by hydroxy or lower alkyl radicals and R is hydrogen or lower alkyl, the term " lower " having the meanings defined above) and acid addition salts of such compounds with pharmaceutically acceptable acids.

5. Compounds of the general formula



and salts thereof with pharmaceutically acceptable acids, in which formula Z is an alkylene radical containing 2 or 4 carbon atoms in a straight chain, which radical may be substituted by at least one alkyl group, R^1 is a hydrogen atom or an alkyl radical containing from 1 to 5 carbon atoms, R^1 is a substituted or unsubstituted phenyl radical or a 5- or 6- membered heterocyclic ring, and ring A is a substituted or unsubstituted benzene ring or a cyclohexane or cyclohexene ring.

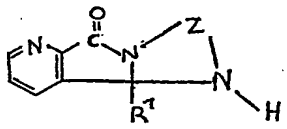
6. Compounds of the general formula:



and salts thereof with pharmaceutically acceptable acids, in which formula R^1 is a phenyl, hydroxyphenyl, halophenyl, lower alkoxy phenyl, halolower alkyl phenyl, lower alkyl phenyl, thienyl, pyridyl or furyl radical, R^2 is hydrogen, halogen, lower alkyl, lower alkoxy, nitro or halolower alkyl, Z is an alkylene radical containing 2 or 4 carbon atoms in a straight chain which radical Z may be substituted by a lower alkyl group, and the term " lower " means the radical contains 1 to 5 carbon atoms.

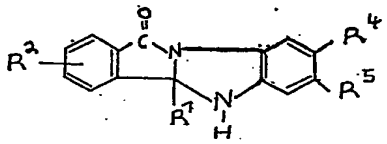
7. Compounds as claimed in Claim 6, wherein Z is an ethylene, 1,2-dimethyl-ethylene or 1-methylethylene radical.

8. Compounds of the general formula



in which R^1 is a phenyl, *p*-halophenyl, lower alkylphenyl, lower alkoxyphenyl, 2-thienyl or 3-thienyl radical and Z is an ethylene, 1,2-dimethyl ethylene, *n*-propylene or 2-hydroxypropylene radical, or an *o*-phenylene radical which may if desired be substituted by a lower alkyl radical, a halogen atom, a halolower alkyl radical, a sulphamyl radical or an alkyl sulphamyl radical, and the term " lower " means the radicals contain from 1 to 5 carbon atoms.

9. Compounds of the general formula



in which R^1 is a loweralkyl, benzyl, phenylethyl, 2- or 3- thienyl, pyridyl, furyl, phenyl, or phenyl substituted by a halogen atom or by a lower alkyl, halolower alkyl, lower alkoxy, or nitro group, R^2 is hydrogen, lower alkyl, halolower alkyl, halogen or nitro, the term " lower " means the radicals contain 1 to 5 carbon atoms, and R^4 and R^5 are halogen or hydrogen atoms.

10. Compounds as claimed in Claim 6, or Claim 7, wherein the ring containing R^2 is an unsubstituted benzene ring.

11. Compounds as claimed in Claim 6, 7 or 10, wherein R^1 is a phenyl, *p*-chlorophenyl or *p*-methoxy-phenyl radical.

12. Compounds as claimed in Claim 9, wherein the ring containing R^2 is an unsubstituted benzene ring.

13. Compounds as claimed in Claim 9 or Claim 12, wherein the radical R^1 is a phenyl or *p*-chlorophenyl radical.

14. 9*b*-Phenyl-1,2,3,9*b*-tetrahydro-5N-imidazo[2,1-a]isoindol-5-one.

15. 1-Ethyl-9*b*-phenyl-1,2,3,9*b*-tetrahydro-5H-imidazo-[2,1-a]isoindol-5-one.

16. 9*b*-(*p*-Chlorophenyl)-1,2,3,9*b*-tetrahydro-5H-imidazo[2,1-*a*]isoindol-5-one.

17. 1 - Ethyl - 9*b* - (*p* - chlorophenyl) - 1,2,3,9*b* - tetrahydro - 5H - imidazo-[2,1-a]isoindol - 5 - one.

18. 9*b* - (*p* - Methoxyphenyl) - 1,2,3,9*b* - tetrahydro - 5H - imidazo[2,1 - *a*]-isoindol - 5 - one.

19. 2,3 - Dimethyl - 9*b* - phenyl - 1,2,3,9*b* - tetrahydro - 5H - imidazo[2,1-*a*]-isoindol - 5 - one.

20. 3 - Methyl - 9*b* - phenyl - 1,2,3,9*b* - tetrahydro - 5H - imidazo[2,1-*a*]-isoindol - 5 - one.

21. 9*b* - Phenyl - 1,2,3,5*a*,6,7,8,9,9*a*,9*b* - decahydro - 5H - imidazo[2,1-*a*]-isoindol - 5 - one.

22. 10*b* - Phenyl - 1,2,3,4,6,10*b* - hexahydropyrimido[2,1-a] - isoindol - 6(2H)-one.

23. 10*b* - (*p* - Chlorophenyl) - 1,2,3,4,6,10*b* - hexahydropyrimido[2,1-*a*] - isoindol - 6(2H)one.

24. The reaction product, of melting point 225—227°C. of *o*-benzoyl-benzoic acid and 1,3-diamino-2-propanol.

25. The reaction product, of melting point 263°C., of *o*-(*p'*-hydroxy-benzoyl)-benzoic acid and 1,3-diamino-2-propanol.

26. The reaction product, of melting point 228°C., of *o*-(*p'*-chloro-benzoyl)-benzoic acid and 1,3-diamino-2-propanol.

27. The reaction product, of melting point 220°C., of methyl-*o*-(*p'*-methoxy benzoyl)benzoate and 1,3-diamino-2-propanol.

28. The reaction product, of melting point 295°C., of 2-benzoyl-cyclohexane carboxylic acid and 1,3-diamino-2-propanol.

29. 9*b*-Benzyl-1,2,3,9*b*-tetrahydro-5H-imidazo[2,1-*a*]isoindol-5-one.

30. 8 - Nitro - 9*b* - phenyl - 1,2,3,9*b* - tetrahydro - 5H - imidazo[2,1-*a*]-isoindol - 5 - one.

31. 9*b* - (*p* - Chlorophenyl) - 1,2,3,9b - tetrahydro - 5H - imidazo[1,2-*a*]pyrido-[3,2-*c*]pyrrol-5-one.

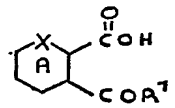
32. 9*b* - (*p* - Chlorophenyl) - 2,3 - dimethyl - 1,2,3 - 9*b* - tetrahydro - 5H-imidazo[1,2-*a*]pyrido[3,2-*c*]pyrrol - 5 - one.

33. 10*b* - (*p* - Chlorophenyl) - 1,2,3,4,6,10*b* - hexahydro - pyrimido[1,2-a]-pyrido[3,2-c]pyrrol - 6(2H)one.

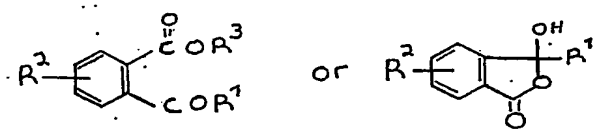
34. 4*b* - (*p* - Chlorophenyl) - 4*b*,5 - dihydro - 11H - pyrido[3',2':3,4]pyrrolo-[1,2-*a*] - benzimidazol - 11 - one.

35. 10*b* - (*p* - Chlorophenyl) - 3 - hydroxy - 1,2,3,4,6,10*b* - hexahydro - pyrimido[1,2-*a*]pyrido[3,2-c]pyrrol - 6(2H) - one.

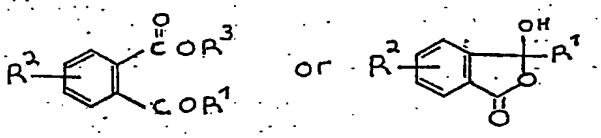
36. 4*b*-Phenyl-4*b*,5-dihydro-11H-isoindol[2,1-*a*]benzimidazol-11-one.
37. 7,8 - Dichloro - 4*b* - phenyl - 4*b*,5 - dihydro - 11H - isoindolo[2,1-a]benzimidazol - 11 - one.
38. 4*b* - (*p* - Chlorophenyl) - 4b,5 - dihydro - 11H - isoindolo[2,1-*a*]benzimdazol - 11 - one.
39. 4*b*-(αThienyl)-4*b*,5-dihydro-11H-isoindolo[2,1-a]benzimidazol-11-one.
40. 4*b*-Methyl-4*b*,5-dihydro-11H-isoindolo[2,1*a*]benzimidazol-11-one.
41. 4*b*-Benzyl-4*b*,5-dihydro-11H-isoindolo[2,1-*a*]-benzimidazol-11-one.
42. The reaction product, of melting point about 130°C., of *o*-(*p'*-chlorobenzoyl)benzoic acid and 1,2-diaminopropane.
43. 2,3 - Dimethyl - 9*b* - (2 - thienyl) - 1,2,3,9*b* - tetrahydro - 5H - imidazo-[2,1-*a*]isoindol - 5 - one.
44. The reaction product, of melting point 203—5°C., of 1,2,3,6-tetrahydro-*o*-benzoyl benzoic acid and ethylene diamine.
45. 9*b* - (*p* - Hydroxyphenyl) - 1,2,3,9*b* - tetrahydro - 5H - imidazo[2,1-*a*]-isoindol - 5 - one.
46. 9*b* - (3 - Amino - 4 - chlorophenyl) - 1,2,3,9*b* - tetrahydro 5H - imidazo [2,1-*a*]isoindol - 5 - one.
47. The reaction product, of melting point about 192°C., of *o*-(*p'*-chloro-benzoyl)benzoic acid and 1,2-diaminopropane.
48. 9*b* - (3 - Amino - 4 - chlorophenyl) - 1 - methyl - 1,2,3,9*b* - tetrahydro-5H - imidazo[2,1-*a*]isoindol - 5 - one.
49. 9*b* - (*p* - Chlorophenyl) - 1 - methyl - 1,2,3,9*b* - tetrahydro - 5H - imidazo-[2,1-*a*]isoindol - 5 - one.
50. 10*b* - Thienyl - 1,2,3,4,6,10*b* - hexahydropyrimido - [2,1-*a*] - isoindol - 6-(2H) - one.
51. 9 - Nitro - 10*b* - phenyl - 1,2,3,4,6,10*b* - hexahydropyrimido[2,1-*a*]isoindol-6(2H) - one.
52. The reaction product, of melting point 166—8°C., of *o*-phenylacetylbenzoic acid and 1,3-diamino-2-hydroxy-propane.
53. 10*b*-Benzyl-1,2,3,4,6,10b-hexahydropyrimido[2,1-*a*]isoindol-6(2H)one.
54. The reaction product, of melting point 219—221°C, of *o*-(3-amino-4-chlorobenzoyl)-benzoic acid and 1,3-diamino-2-hydroxy propane.
55. 10*b* - (3 - amino - 4 - chlorophenyl) - 1,2,3,4,6,10*b* - hexahydro - pyrimido [2,1-*a*]isoindol - 6(2H)one.
56. 4*b* - (*p* - fluorophenyl) - 4*b*,5 - dihydro - 11H - isoindolo[2,1-a]benzimidazol - 11 - one.
57. A process of producing a compound as claimed in Claim 1, which comprises reacting a diamine having the formula $RHN—Z—NH_2$ with a compound having the formula:



or a functional derivative thereof, wherein Z, ring A, X and R^1 have the meanings defined in Claim 1, and R is hydrogen or alkyl.
58. A process as claimed in Claim 57, wherein a compound of the general formula



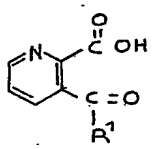
is reacted with a diamine of the general formula H_2N ZNHR in which R, R^1, R^2, R^3 and Z have the meanings defined in Claim 4.
59. A process as claimed in Claim 57, wherein a compound of the general formula



is reacted with a diamine of the general formula H_2NZNHR in which R^1, R^2 and Z have the meanings defined in Claim 6, and R and R^1 each is a hydrogen atom or a lower alkyl radical containing from 1 to 5 carbon atoms.

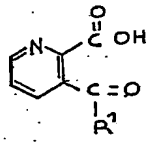
60. A process as claimed in Claim 59, wherein the diamine of general formula $H_2N—Z—NHR$ is ethylene diamine, N-ethyl ethylene diamine, 2,3-diaminobutane or 1,2-diaminopropane.

61. A process as claimed in Claim 57, wherein a compound of the general formula

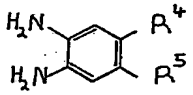


is reacted with a diamine of the general formula $NH_2—Z—NH_2$ in which R^1 and Z have the meanings defined in Claim 8.

62. A process as claimed in Claim 57, wherein a compound of the general formula



is reacted with a diamine of the general formula



in which R^1, R^2, R^4 and R^5 have the meanings defined in Claim 9.

63. A process as claimed in Claim 60, wherein the diamine is reacted with *o*-benzoylbenzoic acid, *o*-(*p'*-chlorobenzoyl)benzoic acid, methyl-*o*-(*p'*-methoxybenzoyl)benzoate or 3-benzyl-3-hydroxy phthalide.

64. A process as claimed in Claim 58 wherein the diamine is 1,3-diamino propane or 1,3-diamino-2-propanol.

65. A process as claimed in Claim 64, wherein the diamine is reacted with *o*-benzoyl benzoic acid, *o*-(*p'*-chlorobenzoyl)benzoic acid, *o*-(*p'*-hydroxybenzoyl)benzoic acid or methyl-*o*-(*p'*-methoxy benzoyl)benzoate.

66. A process as claimed in Claim 61, wherein 1,2-diaminoethane, 2,3-diaminobutane, 1,3-diaminopropane, *o*-phenylene diamine or 1,3-diamino-2-propanol is reacted with 3-(*p*-chlorobenzoyl) picolinic acid.

67. A process as claimed in Claim 62, wherein *o*-phenylene diamine or 4,5-dichloro-*o*-phenylene diamine is reacted with *o*-benzoylbenzoic acid, *o*-(p'-chlorobenzoyl)benzoic acid, *o*-(*α*-thenoyl)-benzoic acid, *o*-acetylbenzoic acid or 3-benzyl-3-hydroxyphthalide.

68. A process as claimed in Claim 60 wherein ethylene diamine is reacted with *o*-(*p'*-chlorobenzoyl)benzoic acid.

69. A process as claimed in any of Claims 57 to 68 whenever carried out at a temperature in the range 75—200°C.

70. A process as claimed in any of Claims 57 to 69, whenever carried out with the reactants dissolved in an inert solvent.

71. A process as claimed in claim 58 or claim 59 substantially as described with reference to any one of Examples 1 to 16.

72. A process as claimed in Claim 61, substantially as described with reference to any of Examples 18 to 22.

73. A process as claimed in Claim 62, substantially as described with reference to any of Examples 23 to 28.

74. A process as claimed in Claim 57, substantially as described with reference to Examples 17 or any of Examples 29 to 45.

75. A compound produced by a process according to any one of Claims 57 to 74.

76. A compound produced by a process according to Claim 58, 59 or 60.

77. A compound produced by a process according to Claim 61.

78. A compound produced by a process according to Claim 62.

79. A process for the preparation of acylation products of a compound as claimed in Claim 1 when said compound contains a secondary amino group, which comprises reacting said compound with an acylating agent.

80. A process as claimed in Claim 79, wherein the acylating agent is an acetylation agent.

81. A process as claimed in Claim 80, wherein the acetylation agent is acetic anhydride.

82. Acetylated products when produced by the process claimed in any of Claims 79 to 81.

83. A pharmaceutical composition comprising a compound according to any one of Claims 1 to 5, 42 to 56, 75 and 82, in association with a pharmaceutically acceptable carrier.

84. A pharmaceutical composition comprising a compound as claimed in any of Claims 6, 7, 10, 11, 14 to 30 and 75, in association with a pharmaceutically acceptable carrier.

85. A pharmaceutical composition comprising a compound as claimed in any of Claims 8, 31 to 35 and 77 in association with a pharmaceutically acceptable carrier.

86. A pharmaceutical composition comprising a compound as claimed in any of Claims 9, 12, 13, 36 to 41 and 78 in association with a pharmaceutically acceptable carrier.

87. A pharmaceutical composition according to any of claims 83 to 86 in oral or parenteral unit dose form.

88. A process of bringing a compound according to any one of Claims 1 to 56, 75 and 82 into a form suitable for therapeutic administration which comprises associating it with a pharmaceutically acceptable carrier.

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